

Application No. 10/529,307

Reply to Official Action mailed on April 10, 2007

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**CENTRAL FAX CENTER**  
**AUG 10 2007****Remarks/Arguments**

Claims 1-14 are currently pending in the instant application. Claims 1 and 11 have been amended.

**Telephone Interview Summary**

Applicant wishes to thank the Examiner for consenting to the telephone interview of June 28, 2007, and for the follow-up telephone call of July 5, 2007. A complete and proper recordation of the substance of the telephone interview is provided, as follows:

- A) No exhibits were shown nor was any demonstration conducted.
- B) Claim 1 was discussed.
- C) The sole reference discussed was Stiehl et al. (U.S. 4,878,149).
- D) No proposed amendments of a substantive nature were discussed.
- E) During the course of the telephone interview, Applicant asserted that the Stiehl et al. reference does not constitute analogous art, as it is neither reasonably pertinent to the particular problem with which the inventor was concerned nor was it in the field of Applicant's endeavor. Applicant pointed out that claim 1 relates to an apparatus for separating ions, and that a person having ordinary skill in the art at the time the invention was made would have understood the apparatus to be a high field asymmetric waveform ion mobility spectrometer (FAIMS), based on the application of an asymmetric waveform and direct current compensation voltage. Applicant then discussed, in general terms, the separation of ions from a mixture of ions according to the FAIMS mechanism, as is also outlined in paragraphs [0004] through [0006] of the application as originally filed.

In addition, Applicant pointed out that Stiehl et al. discloses merely an ionizer for generating ions in a gas stream. In particular, Stiehl et al. discloses a device that is intended to be disposed below a ceiling fan in a clean-room environment. The device produces ions between a point discharge electrode and a counter electrode, the ions

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accumulating during application of a first voltage and then being pulsed out into the clean room when the polarity of the voltage is reversed. In this way, the airflow from the ceiling fan sweeps clouds of positive ions and clouds of negative ions into the clean room in an alternating fashion, but it does not separate ions. The voltage pulses are steep edged and the spacing between pulses is adapted to the speed of the gas stream, such that ions of one polarity transit from the device prior to ions of opposite polarity being produced. According to Stiehl et al., the device produces ions in the gas stream for reducing electrostatic charges, which on sensitive products in the clean room can lead to unacceptable dust accumulation or damage due to uncontrolled discharge. Clearly, Stiehl et al. was concerned with a problem that is completely unrelated to separating ions as is claimed at claim 1 of the instant application.

Applicant noted that the suggested combination of Stiehl et al. and Carnahan et al. was not proper, since to rely on a reference under 35 U.S.C. 103, it must be **analogous** prior art.

F) The Examiner indicated that it is not clear, based on the wording of claim 1, that the claimed apparatus is a FAIMS device. Applicant noted that claim 1 recites

“at least an electrical controller for electrically coupling to at least one of the plurality of first electrode portions and the plurality of second electrode portions, for applying an asymmetric waveform voltage between the plurality of first electrode portions and the plurality of second electrode portions and for applying a direct current voltage between the plurality of first electrode portions and the plurality of second electrode portions so as to establish an electric field within the portion of the analytical gap.”

A person having ordinary skill in the art at the time the invention was made would have understood the application of the asymmetric waveform voltage and the direct current voltage to mean that the apparatus is a FAIMS device.

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During the follow-up telephone call of July 5, 2007, the Examiner noted that a statutory double patenting rejection also may be possible based on claim 17 of copending Application No. 11/285,162.

G) No agreement was reached. Applicant agreed to consider clarifying the language of claim 1. That being said, no specific language was discussed for amending the claims.

### Claim Rejections – 35 USC § 103

*Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stiehl (US 4,878,149) in view of Carnahan (US 5,420,424).*

Applicant respectfully traverses the rejection of claim 1 under 35 U.S.C. 103(a). To rely on a reference under 35 U.S.C. 103, it must be **analogous** prior art. More particularly, the reference must either be in the field of Applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. Stiehl et al. states at col. 1, lines 7-12 "the invention relates to a device for generating ions in gas streams for reducing electrostatic charges which, on sensitive products, such as e.g. microchips, films, magnetic plates, laser storage plates and printed circuit boards, in the case of an uncontrolled discharge lead to destruction or increased particle deposition." The cited reference discloses a device including a pulsed high voltage supply, which supplies an alternating sequence of negative and positive pulses with steep edges to an electrode arrangement with at least one point discharge electrode and at least one counter electrode (see abstract). At col. 6, lines 14-51 and Fig. 2, Stiehl et al. discloses that during a time  $t_1$  positive ions are produced and scarcely any of these ions escape from the space between the electrodes. During a time  $t_2$  the positive high voltage is disconnected and the accumulated ions are discharged out of the device through the frictional force of the airflow. During a time  $t_3$  the antipole negative high voltage is applied and negative ions are produced and retained within the device. Finally, during a time  $t_4$  the negative high voltage is disconnected and the accumulated ions are discharged out of the device through the frictional force of the airflow. As Stiehl et al. states at col. 1, lines 51-55 "the charging of insulating surfaces on the product and increased particle

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deposition can be prevented through the air flow containing ions having a positive and negative sign. Thus, charges are compensated both on airborne particles and on the product surfaces." Clearly, Stiehl et al. is concerned with the problem of preventing damage to product surfaces in a clean room or other similar environment.

In contrast, the problem that confronted the inventor named in the instant application relates to the analytical separation of different types of ions, one from another, in a mixture comprising a plurality of ion types. The problem that is addressed is identified clearly in the preamble of amended claim 1 of the instant application, which states "a high field asymmetric waveform ion mobility spectrometer (FAIMS) apparatus for separating one type of ion from a mixture including a plurality of different types of ions." Furthermore, it is stated at independent claim 1 that "ions propagating along a direction that is transverse to both the first length and the second length are separated in the portion of the analytical gap between the outer surface of the first electrode portion and the outer surface of the adjacent second electrode portion." Applicant submits that the problem of separating ions one type from another in the analytical gap of a FAIMS apparatus is entirely different than the problem of producing clouds of positive and negative charged ions in a gas stream for preventing damage to product surfaces in a clean room or other similar environment.

Accordingly, Applicant respectfully submits that the Stiehl et al. reference does not constitute analogous prior art, and therefore the Examiner has failed to establish a *prima facie* case of obviousness. In particular, the cited reference is not reasonably pertinent since it not only belongs to a different field of endeavor, but also because the matter with which it deals would not logically have commended itself to the inventor's attention in considering his problem. Applicant can imagine no logical reason to consider a reference that teaches merely a device for producing positive and negative ions in a clean room environment so as to reduce electrostatic charges on sensitive products, when attempting to solve the problem of effecting analytical separations of ions from a mixture of ions in the gas phase.

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For completeness, Applicant agrees with the Examiner's statement on page 3 of the Office Action mailed on April 10, 2007 that "Stiehl does not disclose that the voltage applied to the two types of electrodes are an asymmetric waveform for applying a direct current voltage between the plurality of first electrode portions and the plurality of second electrode portions." Applicant is uncertain as to why the Examiner has stated an asymmetric waveform for applying a direct current voltage. In fact, Applicant notes that claim 1 actually recites (emphasis added) "at least an electrical controller for electrically coupling to at least one of the plurality of first electrode portions and the plurality of second electrode portions, **for applying an asymmetric waveform voltage** between the plurality of first electrode portions and the plurality of second electrode portions **and for applying a direct current voltage** between the plurality of first electrode portions and the plurality of second electrode portions." Thus, according to the invention as claimed at claim 1, the asymmetric waveform and direct current voltage are applied to the electrodes independently such that different combinations of the two may be selected for separating a desired type of ion from a mixture containing a plurality of different ion types.

Applicant respectfully submits that since the Stiehl et al. reference does not constitute analogous prior art, therefore the rejection of claim 1 under 35 U.S.C. 103(a) as being obvious over Stiehl et al. in view of Carnahan et al. is improper. Favorable consideration is kindly requested.

Furthermore, even though Applicant believes claim 1 currently of record is in proper condition for allowance, still Applicant has chosen to amend claim 1 in order to define more clearly that subject matter which Applicant considers to be the invention. In particular, the preamble of claim 1 has been amended to read (*emphasis added*):

*"A high field asymmetric waveform ion mobility spectrometer (FAIMS) apparatus for separating one type of ion from a mixture including a plurality of different types of ions..."*

Accordingly, the preamble of claim 1 now recites explicitly a high field asymmetric waveform ion mobility spectrometer (FAIMS) apparatus. In addition, amended claim 1

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now recites separating one type of ion *from a mixture* including a plurality of different types of ions. In addition, claim 1 has been further amended to recite (*emphasis added*) "...a space between the outer surface of a first electrode portion and the outer surface of an adjacent second electrode portion defining a portion of an analytical gap for separating *the one type of ions from the mixture including the plurality of different types of ions.*"

Applicant wishes to state on the record that none of the above-mentioned amendments to claim 1 is intended to be a narrowing amendment. Rather, the additional wording is intended merely to clarify that which is already claimed. A person having ordinary skill in the art would have understood the term "separating" to mean to divide a larger set into two or more subsets or groups. In fact, Applicant believes that this is the common meaning of the term "separating," as is reflected in the wording that Applicant used in paragraph [0033] of the application as originally filed. Furthermore, Applicant believes that it would have been absolutely clear to a person having ordinary skill in the art at the time the invention was made that the apparatus is a high field asymmetric waveform ion mobility spectrometer (FAIMS) apparatus, based upon the original wording "... an electrical controller ... for applying an asymmetric waveform voltage ... and for applying a direct current voltage ... so as to establish an electric field within the portion of the analytical gap." Accordingly, the proposed amendments to claim 1 are not intended to add additional limitations, but rather are intended to clarify that which is already claimed. For certainty, Applicant does not intend to relinquish any of the scope of the claims as originally filed, nor does Applicant intend to surrender any equivalents to the claimed elements.

Claims 2-10 depend either directly or indirectly from believed allowable claim 1 and are also believed to be in proper condition for allowance. Favorable consideration is kindly requested.

Having regard to amended claim 11, Applicant has already stated *supra* the Stiehl et al. reference does not constitute analogous prior art and therefore the Examiner has failed to establish a *prima facie* case of obviousness. Applicant respectfully submits that the rejection of claim 11 under 35 U.S.C. 103(a) is improper for the same reasons that were

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presented above with reference to amended claim 1, *mutatis mutandis*. Favorable consideration is kindly requested.

Furthermore, even though Applicant believes claim 11 currently of record is in proper condition for allowance, still Applicant has chosen to amend claim 11 in order to define more clearly that subject matter which Applicant considers to be the invention. In particular, the preamble of claim 11 has been amended to read (*emphasis added*):

*"A high field asymmetric waveform ion mobility spectrometer (FAIMS) apparatus for separating one type of ion from a mixture including a plurality of different types of ions..."*

Accordingly, amended claim 11 now recites explicitly a high field asymmetric waveform ion mobility spectrometer (FAIMS) apparatus. Furthermore, amended claim 11 now recites separating one type of ion from a mixture including a plurality of different types of ions.

Applicant wishes to state on the record that none of the above-mentioned amendments to claim 11 is intended to be a narrowing amendment. Rather, the additional wording is intended merely to clarify that which is already claimed. For instance, a person having ordinary skill in the art would have understood the term "separating" to mean to divide a larger set into two or more subsets or groups. In fact, Applicant believes that this is common meaning of the term "separating," as is reflected in the wording that Applicant used in paragraph [0033] of the application as originally filed. Furthermore, Applicant believes that it would have been absolutely clear to a person having ordinary skill in the art at the time the invention was made that the apparatus is a high field asymmetric waveform ion mobility spectrometer (FAIMS) apparatus, based upon the original wording "... an electrical controller ... for establishing an electric field within the analytical gap by the application of an asymmetric waveform voltage ... and by the application of a direct current voltage." Accordingly, the proposed amendments to claim 11 are not considered to add additional limitations, but rather are intended to clarify that which is already claimed. For certainty, Applicant does not intend to relinquish any of the scope of the claims as

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originally filed, nor does Applicant intend to surrender any equivalents to the claimed elements.

Claims 12-14 depend from believed allowable claim 11 and are also believed to be in proper condition for allowance. Favorable consideration is kindly requested.

### Double Patenting

*Claims 1-5 and 7-9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5, 1, 1, 7, 7 and 5 of copending application No. 10/529,306.*

Applicant submits concurrently, but under separate cover, a timely-filed terminal disclaimer, in compliance with 37 CFR 1.321(c), thereby overcoming the provisional obviousness-type double patenting rejection over the earlier filed, but still copending, Application No. 10/529,306. Accordingly, claims 1-5 and 7-9 are now believed to be in proper condition for allowance. Favorable consideration is kindly requested.

As Applicant has noted *supra*, the Examiner suggested during the follow-up telephone call of July 5, 2007 that a statutory double patenting rejection also may be appropriate based on claim 17 of copending Application No. 11/285,162. Although this issue was not raised formally in the Office Action dated April 10, 2007, Applicant wishes to provide the following comments in order to facilitate future prosecution of the instant application. Firstly, Applicant notes that a statutory double patenting rejection likely is not appropriate in this case since the subject matter that is claimed in claim 17 is not **identical** to the subject matter that is claimed in any of the claims of the instant application. Claim 17 of the 11/285,162 application depends from claim 1 via claim 16. Claim 1 requires "a controller for **controllably** varying a length of an average ion flow path through the FAIMS analyzer region." Claim 16 further recites "wherein the controller is an electrical controller" and claim 17 specifies an electrode geometry that is similar to the one that is claimed in the instant application. However, Applicant notes that Claim 17 also includes a wherein clause specifying that the electrical controller is for *selectably* applying a predetermined asymmetric waveform voltage between predetermined first and second



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electrode portions to define a first average ion flow path having a first length, and between different predetermined first and second electrode portions to define a second average ion flow path having a second length that is different than the first length. None of the claims in the instant application claims an electrical controller for *selectably* applying a predetermined asymmetric waveform voltage such that an average ion flow path through the analyzer region is variable. Applicant respectfully submits that the instant application and copending Application No. 11/285,162 do not claim the same invention. Applicant further submits that since the instant application is otherwise believed to be in proper condition for allowance, and since Application No. 11/285,162 is still pending and has not been allowed, it is appropriate that the instant application be allowed [see MPEP 804(B)(2)].

Applicant looks forward to receiving favourable consideration of the instant application.

A Petition for Extension of Time is filed concurrently with this response.

**Please charge any additional fees required or credit any overpayment to Deposit Account No: 50-1142.**

Respectfully submitted,



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